

[CLAIMS

Sub
a' 1. Cork with printed image on its cylindrical surface, characterized by that the image is polychromatic.

2. Method for printing of polychromatic images on cork, wherein colours separation has previously been made, that by using i basic colours, where $i = 2$ to n allows the formation of polychromatic image. the corks are delivered to an operating zone, and the corresponding inks according to the number of the basic colours are conducted to printing rollers by means of transfer rollers, by oscillation, inks are spread over the cylindrical surface of the cartridges for the achievement and the maintenance of a regular ink layer characterized by, that corks (1) are successively supplied one after the other vertically in the operating zone by gravitation at which the cork (1) that will be printed is fixed with its axis in vertical position with the possibility of unlimited rotation around the axis of its cylindrical surface, establishing simultaneous contact with radially placed fixing devices (7_j) where $j = 3$ to m along the effective diameter of the cork (1), by which all fixing devices (7_j) come into contact in their corresponding contact points thus eliminating the deviations in the cylindrical shape of the surrounding surface of the cork (1), then all printing rollers (6_i) with diameter equal to the diameter of the cork (1) enter into simultaneous contact with the cylindrical surface at the level of the effective diameter of the cork (1), following a simultaneous rotation of the cork (1) at one revolution by the fixing devices (7_j), that make the turn along with the printing rollers (6_i) at equal peripheral speed in their contact points with the cork (1) surface. while all printing rollers (6_i) spread simultaneously the print of the corresponding colour (2_i) on the colour zone of the cork (1) surface corresponding to each roller (6_i), according to the previous colour

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separation, and at the end of the turn, the polychromatic image (3) on the surface of the cork (1) is fully made, and then all printing rollers (6_i) and fixing devices (7_j) are drawn back from the cork (1), its axis is released and is pulled back from the operating zone, at which in the interval to the next loading of the operating zone, the printing rollers (6_i) make contact with the transporting rollers (5_i) to cover their printing relief with the corresponding ink colour, and during the printing interval, when the printing rollers (6_i) are not in contact with the transporting rollers (5_i), the latter make contact with intermediate rollers (8_i) that are in constant contact with the supply surface of the corresponding ink cartridges (4_i) for each colour and transfer ink to the corresponding intermediate rollers (8_i) during the whole rotation of each ink cartridge (4_i), and all the time while the rotation of each ink cartridge (4_i) is taking place, the thickness and regularity of the ink layer on its transferring surface is additionally maintained within the normal range by oscillating spread, being the axis of at least one printing roller (6) during the printing process fixed strongly in radial position to the cork (1), and the axes of the remaining printing rollers (6) exercise a selective radial pliability to the cork (1) surface.

3. Method for printing polychromatic images on cork (1) according to claim 2, characterized by that the axes of all printing rollers (6) exercise a selective radial pliability with regards to the cork (1) surface.

4. Polychromatic image printing machine on cork (1) consisting of printing roller, ink cartridge, fixed to the base of the machine, transferring, and intermediate roller, characterized by that there are $n-1$ more printing rollers (6_i), ink cartridges (4_i), transferring rollers (5_i) and intermediate rollers (8_i), wherein n is the number of colours

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(2) of the colour separation, and over the operating zone there is a vertical floating magazine (9), and under the operating zone there is an orifice (10) to a chute (11), and a mobile vertical support (12) with vacuum catch (13) of its upper edge is aligned to the axis of the operating zone and passes through the orifice (10), and in upper end position contacts the cork (1) with the vacuum catch (13), and in the lower end position is under the level of the orifice (10), at which the fixing rollers (7_j) where $j = 3$ to m are placed vertically with rotation axis parallel to the axis of the operating zone, that in printing mode, the printing rollers (6_j) and the fixing rollers (7_j) are positioned to the effective diameter of the cylindrical surface of the cork (1), the axis of at least one printing roller (6) is fixed firmly in radial position to the cork (1), and the axes of the other printing rollers (6) have a selective radial pliability to the cork (1) surface, and the printing rollers (6_j) are not in contact with the transporting rollers (5_j), the latter being in contact with the intermediate rollers (8_j), that are in permanent contact with the spreading surface of the corresponding ink cartridges (4_j) for each colour (2_j), that in recharging mode, all printing rollers (6_j) and fixing rollers (7_j) are set aside the cork (1), the printing rollers (6_j) are in contact with their corresponding transporting rollers (5_j), and the latter are not in contact with the intermediate rollers (8_j), that every ink cartridge (4_j) has an oscillating roller (14) with axis parallel to the axis of the ink cartridge (4), and outer surface being in permanent contact with the spreading ink cartridge (4) surface, that the axis of this oscillating roller (14) is connected to the axis of the worm (15) of a worm reductor (16), its worm-wheel (17) being connected through an eccentrically fixed lever (18) to a support (19) of the oscillating roller (14), that the axis of every fixing roller (7) is articulated through a slide (20), which is placed into a channel (21) formed by support sectors (22), and a leading roller (23), fixed to the lower part of the slide (20), is placed into a guiding channel (24) in

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rotating leading synchronized disk (25) which rotation axis fits in the axis of the operating zone, and a chain wheel (26) fixed to the synchronizing disk (25) by first leading chain (27) is connected to the engine axis (28) providing radial movement of the pressing rollers (7) to and from the effective diameter of the cork (1), that the axis of every pressing roller (7) under the slide (20) is articulated in the inner edge of an arm (29), which outer end is articulated to arm (30), freely articulated on a central axis (31), articulated in the carcass of the machine, wherein the central axis (31) is articulated along a second axis (32) in which lower end are located two gear-wheels (33) and (34), and in their upper end is located a gear-wheel (35), that through a second chain (36) is connected to a gear-wheel (37), fixed to the axis (38) of the printing head (6), that an engine for rotation of one cycle (39) by third chain (40) is connected to the gear wheels (33) of all second axis (32), which lower gear-wheels (34) through their corresponding fourth chains (41) are connected to lower gear-wheels (42) on axes (43), positioned along the axis in the axes (44) of the articulations between the arms (29) and (30), upper gear wheels (45) of the axes (43) are connected to fifth chains (46) to their corresponding gear-wheels (47) in the lower end of the axes of the fixing rollers (7), that at least one central axis (31) is connected to the corresponding leading fork (48) in which channel (49) is located pin (50), eccentrically positioned to the axis of the engine (51) for putting it in motion, that to every central axis (31) is fixed a curved arm support (52) for the corresponding printing roller (6), articulated in its curved edge, the arms (52) being kinematically connected and synchronized thorough their corresponding gear-wheels (53), fixed to the central axes (31) and covered by a sixth chain (54), that a supporting fork (55) is freely articulated under every arm support (52) towards its central axis (31), an eccentric stop (56) being installed to the fork, being the arm (57) of the stop articulated to the arm support (52), and a leading

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pneumatic cylinder (58) is articulated between the fork (55) and the arm (52), at which fork (59) for the intermediate roller (8) and the support (19), made as a fork (60), for the oscillating roller (14) are articulated to the fork (55), and the rollers (8) and (14) placed over them are constantly pressed to the cylindrical surface of the ink cartridge (4) by means of a spring (61) between fork (59) and fork (60).

5. Polychromatic image printing machine on cork according to claim 4, characterized by that all central axes (31) covered by the sixth chain (54) are connected through it directly to the axis of the oscillating engine (51).

6. Polychromatic image printing machine on cork according to claim 4, characterized by that all gear belt washers (62) of the ink cartridges (4) are grasped by a gear belt (63), connected through a support roller (64) with a gear belt wheel (65) to the engine axis (66) for setting them in motion.

7. Polychromatic image printing machine on cork according to claim 4, characterized by that the supplying magazine (9) consists of various guides (67), forming a vertical channel (68), and every guide (67) has at any edge one adjustable support (69), and at least one of these guides is mobile and is provided of a guiding element (70), its internal surface having a projection (71) for contact with the cork (1) that is on the exit of the vertical channel (68).

8. Polychromatic image printing machine on cork according to claim 4, characterized by that every adjustable support (69) consists of slide (72) for connecting to the corresponding guide (67), pressed by a spring (73) into a cylinder (74) and supporting with its head an adjusting screw (75).

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9. An ink cartridge for a machine of polychromatic image printing on cork, consisting of shaft and vertical tank of internal cylindrical volume for the ink and nozzles on its wall, characterized by that the vertical tank (77) is a cylinder and is placed axially to the head of the shaft (76), and the nozzles are radial and are symmetrically positioned along N screw lines, regularly spread over the tank surface (77), and it has an axial core (81) with the form of two-stage cylinder, its stage (82) having a smaller diameter and forming a peripheral hollow ring (83) with the inner surface (77) of the tank, and its second stage (84) has a diameter equal to the inner diameter of the cylindrical volume (78) with a small installation gap and inner chamber (85) with the shape of an open frustum of a cone and slots (86) to the hollow ring (83), that on the tank (77) and the chamber (85) there is a lid (87) with orifice (88) in the center.

(56) 1. EP 0365135

2. DE 2819364

11 figures attached.

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